



7. Transportation

The modes of transportation available to move people in and out and through the city significantly impact the quality of life of those who live and work in Cambridge, affect the kind and nature of land uses in the city, and to the extent economic activity is encouraged or discouraged, ultimately affect the city's economic health. Perhaps no facet of long range planning that so directly and profoundly affects existing residents is influenced so greatly by actions taken by others at the regional, state, and national level. Nevertheless the city has a very critical role to play.

>The ability to expand the city's capacity to accept additional automobile traffic is very limited.

Modest and very local improvements can be made to the city's roadway system that can have beneficial effects within a specific neighborhood or section of the city. Improvements to the Kendall Square and the East Cambridge roadway networks are examples of major projects whose scale is not likely to be duplicated elsewhere in the city in the future. Improvements at a slightly less ambitious scale have been proposed throughout the Cambridgeport industrial area with the same objective in mind: to route commercial traffic around the heart of abutting residential neighborhoods. Nevertheless the capacity of the major arterials in the city is essentially established by current development patterns and roadway configurations. Improved signal management and minor intersection improvements, while possible and desirable, will not substantially alter that capacity.

It is not that significant capital improvements would not increase the speed and quantity of vehicles moving through the city. The historic inner belt proposal, and the extension of Route Two through Cambridge, would have undoubtedly vastly simplified movement of vehicles through the city, even for some residents. The major reconstruction proposed for Alewife Brook Parkway is a more contemporary example. However, any effective increase in the capacity of the city's highway network, whether at the edges in Alewife, Memorial Drive, or Commercial Avenue, or internally along Massachusetts Avenue, Broadway or Prospect Street must of necessity entail destruction of other community values far in excess of the traffic benefits that might accrue.

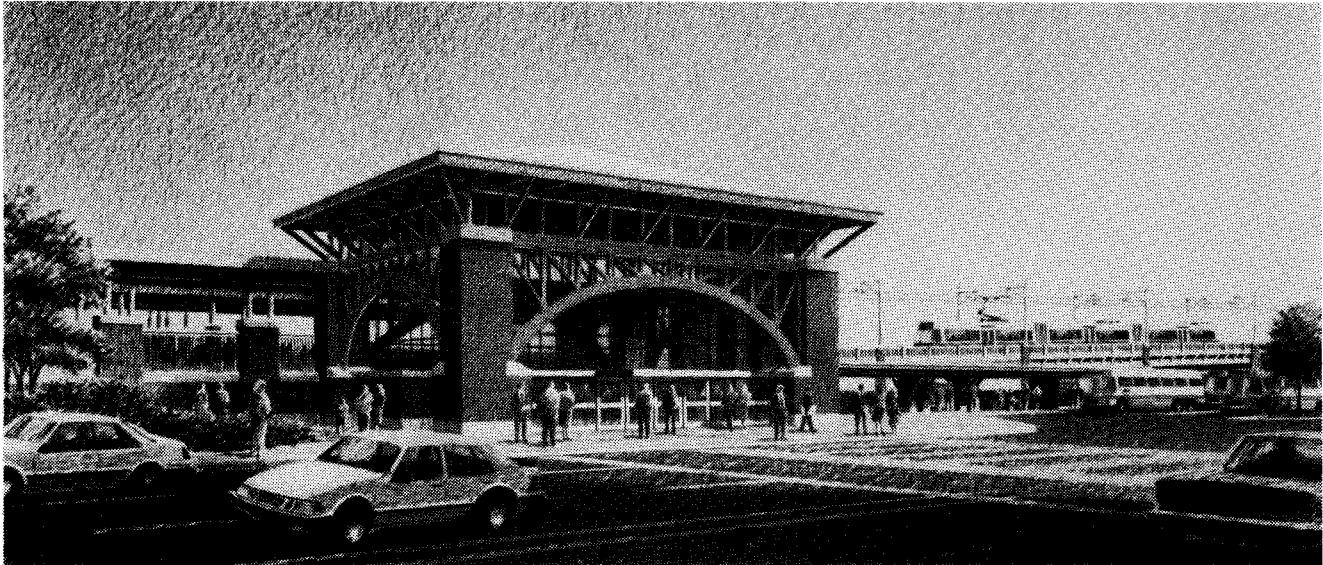
Even modest, non capital changes can have serious negative impacts. The capacity of many arterial streets could be increased by the elimination of parking. Aside from the loss of important parking for residents and visitors, such a change would radically alter the character of streets, rendering them more hostile to the pedestrian and a more significant physical and psychological barrier dividing neighborhoods.

In the end, street capacity improvements may only benefit the commuter whose destination is elsewhere in the metropolitan area and whose home is in some distant suburb.

Assumption

> All reasonable improvements should be made to the roadway network in Cambridge; the objective, however, should be to direct existing as well as future traffic away from local neighborhood streets.

For the foreseeable future, however carefully the City plans, more traffic can be anticipated on city streets, both from increased activity within Cambridge and from economic expansion in the metropolitan area that surrounds it. Nevertheless that additional traffic, and those vehicle trips already traveling in Cambridge, should be directed to the maximum extent possible, to the city's major arteries and away from local neighborhood streets.



In conjunction with plans for the westward extension of the Green Line, a new Lechmere Station is under consideration by the MBTA.

Assumption

> In the future the best hope for improving the mobility of residents and visitors to and from and within Cambridge lies with expansion and improvements to non auto forms of transportation as well as improvement in the efficiency of auto travel that occurs now within the city.

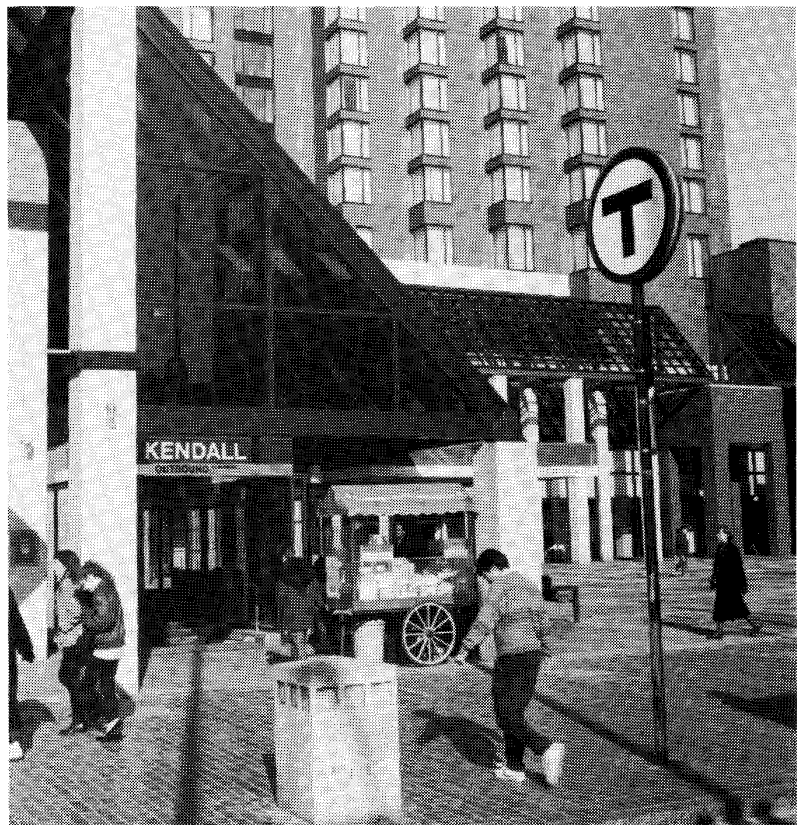
A number of improvements in the short-and long- term should be encouraged within the public transit system. Construction of a new Lechmere Station and the associated westward expansion of the Green Line should be advanced. Expanded and more responsive bus routes could serve the city's new centers of commerce and housing. Additional express buses from suburban locations could facilitate entry into the city's office and commercial districts from more diverse locations, as along the Route 1-93 corridor to the north and the Massachusetts Turnpike corridor to the west. Long-range efforts which hold the potential to greatly benefit the city should be pursued cooperatively with other agencies. An example would be developing transit options along the route encompassed in the MBT A Circumferential Transit Study now underway for portions of Boston, Cambridge, and Somerville in that area which in the past was proposed to be served by the inner belt.

Assumption

>A great potential source of increased mobility in Cambridge, with minimal undesirable side effects, and many positive consequences, is the expansion of public and private incentives to discourage single occupancy use of private vehicles.

The additional commercial and residential development which will inevitably occur in Cambridge can be most easily accommodated if, in addition to expanded use of public transit, private transportation options are made more available to discourage the single person from taking the otherwise empty automobile on all trips to and from the city. The possibilities for improvement are significant and relate not only to transportation policy but to land use and other policies as well.

The City has staffed a Transportation Management Program which even in its first year of operation has begun to have an effect. Through an integrated system of incentives and discouragements, from ride sharing and van pooling to "T" pass sales and subsidies on-site, existing businesses as well as new development have begun to explore the options available to replace the costly provision of parking spaces for employees. Such comprehensive traffic mitigation programs are voluntary for existing



businesses. They have been and should continue to be made compulsory for all significant new large developments in Cambridge. Consideration might be given to phasing in a similar requirement for all existing uses, substituting a requirement for the existing voluntary participation.

Land use choices can influence the transportation choices individuals and companies make. Higher densities should be encouraged at locations most easily served by transit; some high traffic generating uses might be discouraged or prohibited from some locations. The complementary mix of uses that reduces the need to use the car to secure the services needed in a given day should be encouraged. In all instances the city's physical environment should be maintained so as to encourage and nurture the pedestrian.

Assumptions

>Parking availability is a major source of traffic generation in commercial developments and a major disincentive to the use of alternate means of mobility. The parking supply should be controlled in private developments to limit the incentive to use the automobile and to increase the incentive to use alternate means of transportation.

>The acute problem of residential parking on city streets is principally caused by increased car ownership of residents in the existing housing stock which has never had any or sufficient supply of off-street parking.

New residential development cannot be expected to reduce the deficiency of residential parking in the city's older neighborhoods. Excessive parking requirements for new residential uses (greater than one space per unit) will not relieve the current inadequacy but may threaten to increase the cost of new housing (significantly if parking must be provided in a structure) and diminish the quality of the residential environment through increased pavement, reduction in green space, or bulkier residential buildings. In a short seventeen years from 1970 to 1987 car registrations in Cambridge increased by forty percent while the population remained static; the number of housing units increased by perhaps five percent. The acute parking problem experienced by residents on residential streets would appear to be the result of increased car ownership in existing households, many of which have never had any parking facilities at their disposal.

Transportation Policies

These policies are intended to assure a transportation system that will serve the transportation needs of the city's residents and its commerce while being compatible with the economic, social and natural resources of Cambridge.

Reversing Trend in Travel

To effectively realize a Cambridge future consistent with the policies recommended in this document, the city is faced with the need to reverse the trend, evident in recent decades, of greater and greater use of the automobile. A particular challenge is to encourage travel to and from Cambridge from those other towns where travel can be made by means other than the automobile.

Cambridge's population has remained relatively stable over the past twenty years, with a 1970 population of 100,000 and a 1990 population of 96,000. However, while the city's population has changed little, other factors have contributed to a large increase in vehicle travel. These factors have included higher employment, increasing household formation and rising automobile ownership per household. According to U.S. Census figures, 78,000 people were employed in Cambridge in 1970, increasing to 86,500 in 1980. By 1990 employment had risen to over 102,000 people or 31 percent in 20 years, and had undergone a considerable transformation from an industrial base to a service sector oriented market that attracts employees from throughout the region.

During this 20 year time span the home location of Cambridge employees has also changed dramatically. In 1970 almost three quarters of



the people who worked in Cambridge lived in Cambridge or the six abutting towns where transit is available. However, this dropped to two thirds in 1980 and is now down to just one half.

Automobile ownership also experienced great change in Cambridge and throughout the nation, with a clear pattern of rapidly rising rates of auto ownership per household. From 1970 to 1987, the number of cars registered in Cambridge rose by nearly 40 percent from 27,866 to 38,997, despite relatively little change in population and a major investment in expanding and improving the region's transit system. Traffic data available from the Massachusetts Highway Department (MHD) indicates that automobile use has risen considerably during the 1980s, and that the city and metropolitan region have experienced a considerable growth in vehicle miles traveled averaging over 3 percent per year.

By 1987, Cambridge generated nearly 3.3 million vehicle miles of travel per day, which represented 8.2 percent of the total vehicle miles traveled in the Boston metropolitan region. Work-related trips represent the largest share of total travel in Cambridge, comprising over 57 percent of the total travel market. This share includes both Cambridge residents working inside or outside Cambridge and non-Cambridge residents who commute into Cambridge to work. Other non work related trips that are based from the home represent the next largest travel share at 27 percent. Non home based related travel represents the other 16 percent share of travel in Cambridge. Cambridge's importance as a major regional employment center is reflected in its relatively high share of work-trip based travel as compared to the regional average for work-related travel.

Not reflected in any of these totals of vehicle miles of travel are vehicles which pass through the city without stopping. Travel data provided by the Central Transportation Planning office staff for several major and minor arterials in Cambridge indicates that about 33 percent of the total daily traffic on these roadways are through-trips which have no point of origin or destination in Cambridge.

Policies 14 and 15 address actions Cambridge can implement which will make public transportation and other non single occupancy vehicle modes more desirable for travel. The policies encourage the continuation and expansion of the City's successful Transportation Management program which has secured the voluntary cooperation of many Cambridge employers in a wide range of programs that promise to help established companies and their employees alter their commuting habits and provide a framework through which new companies and new employees can do the same more easily.

Central to achieving effective implementation of all transportation policies is the recognition that large generators of trips in Cambridge should be located in areas that are well served by transit.

POLICY 14

Increase the City's investment in Transportation Demand Management to promote non single-occupancy vehicle forms of transportation and assist Cambridge employers, both individually and collectively, in developing such programs for their employees and operations.

POLICY 15

Enact land use regulations that encourage transit and other forms of nonautomobile mobility by mixing land uses, creating a pleasant and safe pedestrian and bicycle environment, and restricting high density development to areas near transit stations.

Movement In and Out of Cambridge

The city's interests are best served if those persons employed in Cambridge or who for other reasons seek services in the city are able to choose a mode other than the automobile to get here. The issue facing the city is how to provide adequate transit service to and from those communities with strong historic travel pattern relationships to Cambridge; and conversely to encourage that relationship with communities which may not now but could have significant transit options available to commuters in the future.

The irregular road network in Cambridge contains numerous intersections with four or more converging streets. Many of these intersections have been identified in recent Environmental Impact Reports as having an existing level of service in the E or F range (that is, very poor, F being the worst condition). The result has been increasing congestion in many parts of the city.

Twenty-two percent of Cambridge employees and 28 percent of the Cambridge labor force traveled to work by transit in 1980. Although these percentages probably improved over the last decade, the majority of workers are still using the automobile for their commute to work. Of significant importance is the high transit use figure for travel to and from communities abutting Cambridge as opposed to those further away. This is probably due to the relatively extensive bus system serving travel to and from these close neighboring communities.

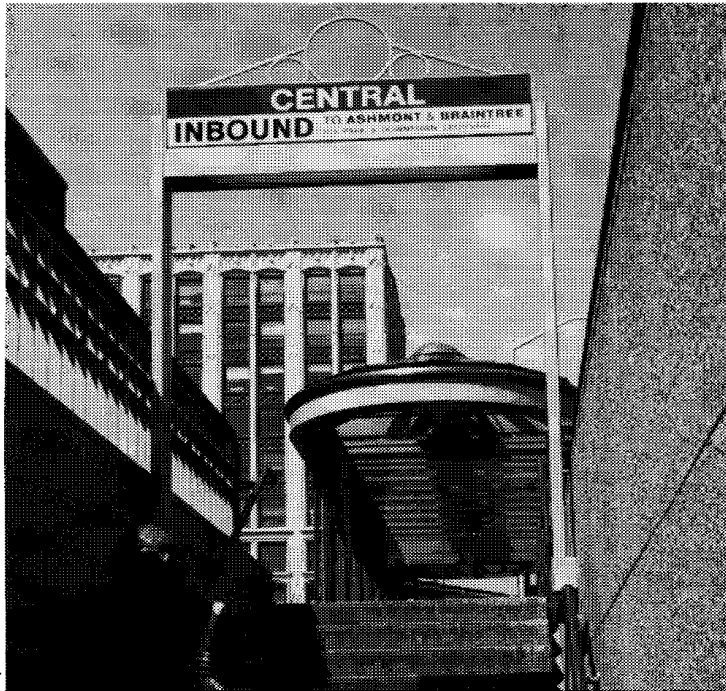
The greatest problem now and in the future is access from the north along the 1-93/Orange Line Corridor. Between 15 and 20 percent of Cambridge jobs are filled by people living in that corridor, but as of now, tran-

POLICY 16

Encourage regional employment patterns that take advantage of areas well served by transit to and from Cambridge.

POLICY 17

Seek implementation of MBTA transit improvements that will provide more direct and, where demand is justified, express service to Cambridge from those portions of the region now inadequately served by transit to Cambridge.



sit does not exist and major improvements are not contemplated in the near future. The Massachusetts Turnpike/Green Line Corridor to the west is another area lacking proper transit service to and from Cambridge.

Implementation of the city's transportation objectives depend heavily on priorities established and supportive actions taken at the regional and state level. Policies 16 and 17 are intended to ensure that Cambridge residents have access to jobs outside the city to which they can get without necessary resort to the automobile and that those who live elsewhere but work in or otherwise have business in Cambridge have the opportunity to do the same.

The City should encourage those regional investments in public transportation services which will make those options available.

Movement within Cambridge

There are many desirable, easily identified options for providing new transportation services to Cambridge. The problem facing the city is how to provide those desirable services and alternate modes of travel while keeping the costs within the financial ability of the city to pay for them.

Except for peak travel times, Cambridge residents who have access to an automobile generally experience little difficulty in satisfying their travel needs. Even under the parking restrictions of the City's Resident Parking Sticker Program, Cambridge residents are still allowed to park anywhere within the city. People relying on public transportation, however, (e.g. the elderly, the handicapped, the young) and others without automobiles, often are restricted as to where they can go for essential services such as medical care, education and recreation, to say nothing of work opportunities.



Most bus lines in Cambridge terminate at either Harvard or Central Squares. At present, only one bus line permits Cambridge residents to travel between the western and eastern parts of the city without the additional cost and delay of at least one transfer. The result has been that of trips made entirely within Cambridge, relatively few are made using public transportation.

The problem of inadequate transportation falls most heavily on the elderly and handicapped. Many of these people do not drive or have access to an automobile. Most of them are dependent on walking and public transportation, but their physical limitations cause difficulties in using fixed route modes. The walk to the bus stop or train station, the wait, the height of the step, the jostling, impatient crowds, the small signs, and the lack of public toilets all combine to make this form of transportation unusable for many people. As a result, they are forced to use taxi cabs, the closest thing to the private automobile. However, the cost of taxi service in general sharply limits travel by this mode, especially for those on low fixed incomes.

Again it is certainly possible to identify logical improvements to the transportation services provided to Cambridge and its residents, especially to those now poorly served. It is nevertheless vital to recognize the financial limitations within which the city must reasonably operate.

POLICY 18

Improve MBTA public transportation service within the city including updating routes, schedules, signs, and bus stop placement.

POLICY 19

Investigate the feasibility of developing and implementing, within the financial resources of the City, a paratransit system, utilizing taxi cabs where appropriate, in order to supplement the current MBTA system in Cambridge.

Neighborhood Protection

To thrive, the city must maintain an acceptable flow of goods and movement of people between their homes and places of employment and the services they require. The need is to maintain that flow with as little negative impact on the city's residential streets and neighborhoods as possible.

The impact of heavy traffic volumes and trucks operating on local residential streets in Cambridge has been well publicized by various public agencies and citizen organizations. The problem has increased steadily over the years with increased development and the opening of the Massachusetts Turnpike and the Route 2 freeway inside Route 128. These major State facilities have been responsible for a substantial increase in through truck traffic on local streets.

Cambridge streets were not designed to ensure compatibility between trucks, high traffic volumes and people. Due to the narrowness of the streets and the close proximity of residential structures, traffic severely impacts residents in terms of noise, vibration, air quality and safety.

Policies 20 through 22 are fairly straightforward. They recognize, however, that the city is imbedded in a larger regional network of streets and highways and that travel and economic patterns often place a constraint on the kinds of actions the city can take independently to reduce the impact of traffic on local streets and residential neighborhoods.

Policy 22 highlights the need to protect residents living along minor arterial streets. For example, removing parking in residential areas to increase vehicle capacity might not be a good idea even though it might have a clear traffic improvement benefit.

POLICY 20

Encourage the state transportation and environmental agencies to develop a regional goods movement plan; in the meantime, use the City's limited authority as much as possible to route truck traffic around rather than through residential neighborhoods.

POLICY 21

Discourage vehicle travel through residential areas both by providing roadway improvements around the neighborhoods' perimeters and by operational changes to roadways which will impede travel on local streets.

POLICY 22

Undertake reasonable measures to improve the functioning of the city's street network, without increasing through-capacity, to reduce congestion and noise and facilitate bus and other non-automobile circulation. However, minor arterials with a residential character should be protected whenever possible.



Bicycles and Pedestrian Improvements

The significant use of the bicycle and walking has many obvious advantages in a crowded city where air pollution, noise, and lack of space are real problems. The issue the city faces is the extent to which safe and convenient rights-of-way and parking facilities for bicycles, pathways for pedestrians, and other improvements can be provided within an acceptable range of impact on other necessary transportation modes and on the existing land use fabric.

The use of the bicycle as a serious means of travel has become popular in recent years. Bicycling is a cheaper mode of travel than the automobile, and is also more healthful and non-polluting but it is inconvenient during times of inclement weather. This growing popularity has led to increased conflict between cyclist and motorists, due in large measure to a lack of public accommodation for the bicycle. The perception of many motorists is that bicycles are children's toys which belong on the sidewalk. On the other hand, many cyclists think of themselves as "pedestrians on wheels" and ignore rules and regulations pertaining to moving vehicles, including stop signs, one-way streets and traffic signals and the needs of pedestrians themselves.

The two major facilities needed for the bicycle are a system of protected rights-of-way and secure storage spaces. Presently, there are few bicycle rights-of-way in Cambridge or in the rest of the metropolitan area. The difficulty with allocating separate bicycle paths within existing rights-of-way is the present competition among cars, buses, trucks, taxis, motorcycles, pedestrians and parked vehicles within an already inadequate physical space. In addition, commercial districts, public buildings, most MBTA stations, and most employers in Cambridge offer very little in the way of bicycle parking facilities.

POLICY 23

Encourage all reasonable forms of nonautomobile travel including, for example, making improvements to the city's infrastructure which would promote bicycling and walking.



Walking is a necessary adjunct to any successful system of nonauto transportation in the city. The objective is to make it a pleasant and functional means of travel in as many kinds of weather as possible. To accomplish that may require some interference with the primacy of more conventional modes of travel, i.e. the automobile, but also requires a concern for the details in the environment that make walking more enjoyable: quality of buildings and sidewalks, a continual network of foot paths to places people want to go, good integration of those pathways with transit, some protection from inclement weather.

Facilitating bicycle use increases the potential interference with the automobile and even with walking when the two are not well separated. Whether removing parking, widening rights-of-way for bike paths or placing bicycle storage facilities in public places, some degree of compromise with other values or objectives may be necessary; some real choices, based on an assessment of relative benefits sustained, must be made.

The Federal Clean Air Act and Transportation Financing

Addressing the transportation objectives implied in the policy statements in this document will require the investment of significant capital and effort by the City and every other level of government and by private businesses and ordinary citizens. In addition Cambridge and the entire region are now faced with another transportation-related imperative: the implementation of the Federal Clean Air Act (CAA) as amended in 1990. A major task facing the city and the region in the next decade is finding the monies necessary to properly maintain the existing transportation system while also implementing projects required to clean our air; simultaneously the city must be concerned with how automobile use can be reduced without disrupting or destroying the economic viability and health of the city.

The CAA requires that no urban area exceed unhealthy air quality conditions more than four times in any three year period. When these standards are exceeded for smog forming compounds, an air quality designation is assigned to the region. Our metropolitan area is designated as moderate for carbon monoxide and as serious for hydrocarbon emissions. The serious designation means that we must reduce air pollution emissions by 15 percent by 1996 and an additional three percent annually until we have achieved a reduction in emissions totaling 30 percent. This is all to be achieved in the face of automobile travel increasing at a current rate of over three percent per year.

A very serious problem arises when transportation needs are matched against available funds. The Fiscal Year 1992 Transportation Improvement Program (TIP) for the Boston Region contains \$3.9 billion in transit improvements and \$5.5 billion in highway improvements programmed over the next five years. However, available federal funds over the next five years appear to be in the neighborhood of only \$455 million (\$569 million after a 20 percent state match) for MBTA transit projects. The problem is that even with full implementation of the TIP projects, the result will be only a 1.67 percent reduction in carbon monoxide.

These policies support programs for clean air but stress the need to take a regional approach to the program. Cambridge working alone will not have much impact and would suffer severe economic consequences as business would relocate to other communities without restriction to the detriment of the region's air and larger land use objectives.

POLICY 24

Support regional transportation and land use policies that will improve air quality by reducing dependence on single-occupancy vehicles, both through reduction in employment-based travel and in other trips taken for nonwork purposes.

POLICY 25

Promote the use of truly clean alternative vehicle technologies for necessary vehicle travel particularly in regards to fleets.